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TABLE OF CONTENTS.


| | PAGE. |
|---|---|
| EDITORIAL ARTICLES:—The Beauty of Evergreens in Snow. (With figure.) | 37 |
| Dr. Mayr on the Parasitic Fungi of North American Forest-trees | 37 |
| Notes of a Summer Journey in Europe.—V.—*J. G. Jack.* | 38 |
| Is Grafting a Devitalizing Process?—I.—*Professor L. H. Bailey.* | 39 |
| PLANT NOTES:—Some Recent Portraits | 40 |
| FOREIGN CORRESPONDENCE:—New Garden-plants of 1891.—II.—*W. Watson.* | 40 |
| CULTURAL DEPARTMENT:—Christmas Roses.—*D. Dewar.* | 42 |
| Seasonable Hints.—*W. H. Taplin.* | 43 |
| Begonias.—*J. N. Gerard.* | 44 |
| Winter-flowering Aquatics.—*Wm. Tricker.* | 44 |
| Citrus trifoliata as a Hedge-plant.—*Professor W. F. Massey.* | 44 |
| The Pin Oak.—*Joseph Meehan.* | 45 |
| CORRESPONDENCE:—The Senecios of the Canary Isles.—*H. Christ.* | 45 |
| Plants for the Sea-shore.—*J. W. Harshberger.* | 45 |
| Chamæcyparis squarrosa.—*J. M. N.* | 46 |
| RECENT PUBLICATIONS | 46 |
| NOTES | 48 |
| ILLUSTRATION:—A New England Winter Scene, Fig 9 | 41 |


## The Beauty of Evergreens in Snow.

ONE of the loveliest of all winter effects is seen when wet and clinging snow falls upon the green branches of conifers, emphasizing their beautiful outlines by its "ridge of pearl."

The peculiar delicacy of snow-shadows, with their tender bluish tint, has something to do with the charm of such a scene as is depicted on page 41, and black and white, however subtly shaded, cannot convey that combination of color peculiar to a winter landscape, that fills the eye with a sense of beauty whose evanescence adds to its precious quality.

The sheeted ground sparkles in sunshine with myriad lights; its seemingly unbroken surface, if studied, reveals innumerable soft dimplings, where lurk the shadows that diversify its whiteness. Through the mass penetrate here and there the brown spears of plants and tall grasses, their dry leaves and shrunken blades tipped with silver, their faded blossoms feathery with plumes of snow. Small trees, springing in the shelter of their elders, are overwhelmed with an ermine burden, beneath which they bend like a boy-prince weighed down by a regal mantle too heavy for his youthful shoulders, and their broken shadows fall upon the snow in wavering patches of purple and gray. Where the drifted snow has been melted by an underlying hillock, its dash of yellow-brown gleams like a golden boss upon a silver shield.

The tiny tracks of woodland creatures, which have stolen forth for provender, make interesting suggestions of hidden life in the solitude, guiding the traveler into the shelter of the trees, where in the crotches of the branches the snow lies massed in great heaps. Each bough shows its outline doubled by a furry trimming. The tall trunks are flecked with snowy patches. If the tree be deciduous a reproduction of its line, firm and graceful as a Japanese drawing, lies across the white ground. Here at your feet, like a master's sketch, can be seen emphasized the swelling of the limb as it throws out a bough, the delicate interlacing of branches, the intricate network of the topmost tangle of twigs. The pyramidal form of the evergreen flecked with light is tenderly reproduced in a tint hovering between blue and gray, which is the despair of the painter, as it is the delight of his eye.

Near the base of the trees where the ground is sheltered, the snow has been warded off, and the soft brown carpet nestles warmly up to the roots and stems, while the wide branches curve with their tips in the snow, making an arched wigwam, protected from the storm. The top needles, agitated by a morning zephyr, have shaken off their hoary hoods, and stand up green and shining against the pale blue of a winter sky, innocent of cloud. As the sun climbs higher there is a low patter among the branches, a fall of snow from an upper limb; soon the rebound of a released branch brings on an avalanche, as the sturdy tree struggles to shake itself free from the encumbering mass. Then from the tree distils an aromatic fragrance as the wet branches grow warm with the approach of noon. The stir of the branches, the rustle of the melting snow falling among them, give a low sweet murmur, the song of the young Fir-tree dreaming of the far-off Palm; of the old Hemlock sighing for some Indian dryad of its youth; of the Pine whispering a saga of a sea-fight and a storm.

The effect of looking down a woodland-path when the trees on either side are laden with snow is of some strange massive architecture of marble, through which one wanders, wondering at the freaks of the builder who has planned these bewildering arches and groinings, supported on columns of diverse proportions. Fantastic forms are everywhere apparent, and the stillness is that of a deserted cavern furnished with stalagmites that ape a forest. For Nature in her various processes is at one, whether she builds trees of stone, or stiffens her forests into a mammoth cave of wonders; and to see these underground effects beneath a blue sky is one of the shows of winter, which has its own museum of delights, wherein ice and frost and snow play marvelous and varied rôles for the beholder.

## Dr. Mayr on the Parasitic Fungi of North American Forest-trees.

IN GARDEN AND FOREST, of December 24th, 1890, appeared a review of Dr. H. Mayr's *Die Waldungen von Nordamerika*, in which the reviewer criticised that portion of the work relating to the fungi found on forest-trees. Since the appearance of the review Dr. Mayr has kindly sent to the editor of GARDEN AND FOREST specimens of some of the fungi mentioned in his work, with the request that they be submitted to the reviewer and the result of his examination printed in GARDEN AND FOREST. The following notes are therefore offered in compliance with Dr. Mayr's request:

In our former notice we expressed the opinion that what was considered by Dr. Mayr to be a new species, and called Rhytisma punctiforme, was in reality the R. punctatum described by Fries in 1819, founded on the Xyloma of Persoon, 1801, a species found both in Europe and North America, where it is common, having been recorded in this country in 1831 by Schweinitz. An examination of Dr. Mayr's specimen of R. punctiforme shows that it is undoubtedly R. punctatum, Fries, which is considered by Rehm and some other recent writers to be a good species, although it was regarded by Tulasne as a form of R. acerinum. In our review it was also remarked that, as far as could be told from Dr. Mayr's description and figures of his Microsphæra Corni, it was identical with the M. pulchra, Cooke and Peck, described in 1872. Examination of the specimens sent confirm the accuracy of our former statement, the appendages, asci and spores agreeing entirely with those of M. pulchra, and whether one agrees with those mycologists who believe that M. pulchra should be referred to a still older species or not, if the spe-

cies be regarded as distinct, there is no doubt that the name M. pulchra should be adopted.

We have examined carefully the specimens of Lophodermium infectans and Hysteriopsis acicola, and in both cases found only young perithecia, without any trace of spores, in the absence of which it is impossible to say to what genus they belong, still less to what species. Dr. Mayr states that he did not find mature stages, and that being the case, we do not think that he was warranted in saying anything more than that the two immature forms in question belonged to some indeterminable species of the order Hysteriaceæ. We are unable to understand the reasons given for making the new genus Hysteriopsis. On page 340 it is said "the genus (Hysteriopsis) differs from those existing in Europe, all of which live on young shoots (Triebbewohner)." But only a few lines previously he says that "the needles of Picea Sitchensis become diseased as if under the influence of a Lophodermium macrosporum." Now, since L. macrosporum attacks the needles (see Hartig, *Wichtige Krankheiten der Waldbäume*, pl. vi., fig. 1—4) it is difficult to see why it is necessary to separate Hysteriopsis from Lophodermium because it grows upon the leaves. In fact, the admitted resemblance to L. macrosporum, which certainly does attack the needles, makes it probable that, if Hysteriopsis acicola be not really an American form of L. macrosporum, it is, at least, a nearly related Lophodermium, which, in the absence of sufficiently well-developed material, cannot be determined.

The specimen of Puccinidia Abietis on Abies concolor we were particularly glad to be able to examine because the original description differs so much from that of any of the Uredineæ known to us that we were unable to recognize the fungus as a species of that order. Dr. Mayr considers that there is at first an æcidium, and that there later develops in and near the æcidia a mass of uredospores, from which, at length, develop teleutospores. The accompanying figures, however, bear little resemblance to any uredo or teleutospores known to us. An examination of the specimens themselves shows the æcidia with their peridia, spores and spermogonia. It is unnecessary to consider what the name of the æcidium is, because, owing to the fact that the specimens are too old, what we might say on this point would be of the nature of a conjecture rather than an exact determination. The important fact revealed by our examination is that what is called by Dr. Mayr the uredospores is in reality not a uredo at all, but a species of Tuberculina, a genus well known to infest Uredineæ in their different stages. Whether, in the present case, we have before us the common T. persicina, or some closely allied Tuberculina, can hardly be definitely settled since the material is too old. If the æcidium has evidently been attacked by a parasitic Tuberculina, the latter has in turn been attacked by some mold belonging to the Hyphomycetes, and it is this second parasite that Dr. Mayr considers to be the teleutospores of the æcidium. But the whole structure is quite different from any teleutospore. The black, carbonaceous mycelium, very irregular in the shape and appearance of the cells, sometimes bears at the tips two-parted cells, but quite as frequently they are not two-parted, but more like what are called Macrosporium spores. It would be quite hopeless trying to name this young mycelium, for one finds very frequently just such forms resulting from the germination of Pleospora and other related genera. It is enough to say that the teleutospores of Dr. Mayr are merely the young stages of some parasitic Pyrenomycete which would be referred to the form genera Cladosporium, Macrosporium, etc., according to the division of the ultimate cells, which, in the present case, is not constant.

In conclusion we would express our indebtedness to Dr. Mayr for his courtesy in submitting, quite unsolicited, his original specimens to us for examination, and, although unable to agree with his determinations of the fungi, we gladly recognize his friendly treatment of a reviewer whose views differ from his own.

## Notes of a Summer Journey in Europe.—V.

THE route from Zurich to Munich took me over Lake Constance to the quaint little harbor of Lindau, in Bavaria. Between Lindau and Munich there are large areas of planted Spruce-forests, and at this time they were looking in fine order and well kept. In many tracts, containing thousands of trees, the trunk of each tree was protected from invasions of ascending insect enemies by a band, presumably, of the same insect-lime which Professor Fernow has advocated so strongly in Garden and Forest (vol. iv., p. 142) and elsewhere. This precaution was particularly directed against the Nonne (Liparis monacha), a large moth, the larvæ of which are said to have done damage to the extent of hundreds of thousands of dollars to the coniferous forests of Bavaria and the adjacent countries in the summer of 1890. Close along the line of railway were myriads of young seedlings, and wherever there was an abandoned gravel-pit or a worn-out piece of soil it had been thickly planted with young Spruces, which would soon make profitable what would otherwise be waste land.

Of the trees planted in the streets of Munich, Lindens, Lombardy Poplars, the Red-flowering Horse-chestnuts, known as Æsculus rubicunda, and Planes (Platanus) seem to be the favorites. The Planes here were in poorer condition than in almost any other place visited where they were much planted, and the Lombardy Poplars were chiefly noticeable on some long streets leading out of the city. The healthiest trees noticed here were two double rows of the Red-flowering Horse-chestnut which partially surround the narrow park-like Promenade Platz. These trees (all grafted, of course) are planted about twenty-four feet apart each way, and give a dense cool shade without growing so high as to obstruct the light and air from buildings. The foliage maintained its characteristic dark green color, and although the trunks were unprotected, few of them showed any signs of mechanical injury. Within the Promenade Platz are well-arranged groups of shrubbery and a few unobtrusive beds of herbaceous plants.

Munich boasts a Royal Botanic Garden, situated well within the city, and of some interest in certain directions. Much pride is evidently felt in the large and high Palm-house, and also in the Alpine Garden, which is built of irregular sandstone-rocks containing innumerable pockets calculated to hold moisture. An attempt has been made to divide this Alpine Garden into sections according to the geographical distribution of the plants, but this arrangement does not seem to work well, or, at least, does not appear to be consistently carried out. Sections are marked out for European, Mediterranean, Taurian, Himalayan and other alpine floras, but the space devoted to each is necessarily absurdly small. Any such arrangement necessitates a good deal of duplication of species, and, of course, few botanic gardens can afford to do more than show a very few typical species of the different genera. The alpines here were in a very vigorous condition, and showed special care. Some of the plants grow so rampantly that they are with difficulty kept within bounds. Such plants as spread from underground shoots are not easily managed in an ordinary rockery because the roots and shoots get among the rocks, where it is difficult to cut them out.

Campanulas and Potentillas were the most conspicuous plants left in bloom. The tallest and most conspicuous of the Campanulas was C. Americana, three or four feet high, with its long spikes of blue flowers. Other more dwarf and more graceful species still blooming were C. turbinata, with wide-spreading white corollas; C. thyrsoidea, with dense erect spikes of pretty white flowers, the corollas densely hairy within; C. pusilla, a very dwarf species, with light blue or white flowers, and a species of Symphyandra, whose blossoms might easily be mistaken for those of a Campanula. A little Aubrietia made a good compact rockery plant for blooming at this season, while Drypis spinosa attracted attention by its innumerable small star-shaped, silvery white flowers.

As the temperature in winter here rarely goes lower than twenty or twenty-five degrees below zero of Reaumur, it is possible to grow some of the species of Cistus in the open air; and several plants of these shrubs were still bearing some of their pretty flowers, which, by their petals and stamens, seem to suggest an alliance between a wild Rose and a St. John's Wort. A handsome fruiting clump of our American Cranberry, growing in the rockery, was found to be planted in a hollow decaying log, which was sunk into the ground and filled with peaty soil.

The collection of herbaceous plants is arranged in good clumps and well separated; and, as would be expected, the composite plants were making the best show at this season (July 29th), although Veronicas, Campanulas, Stachys, etc.,

were also conspicuous. The collection of grasses and sedges was particularly in fine condition. As showing the care and trouble which is in some cases taken in the attempt to secure the best conditions for the rarer plants, it may be mentioned that specially constructed beds are allotted to the Myricas, Andromedas, Vacciniums, the moisture-loving Kalmias, etc. The foundations of these beds are made in the form of large flat tanks, with double sides, lined with cement. These tanks are filled with good-looking peaty soil, surrounded by and saturated with water. Yet, with all this care, the plants look miserable and do not seem to thrive, and, undoubtedly, most of them would do much better under ordinary garden cultivation in a good mixture of peaty soil and sand and with some slight shade from the direct rays of the sun. The plants here were suffering from want of drainage, for, although they like moisture, they do best when placed within reach of water by the roots, instead of being planted in it.

Several acres in the garden are set apart as an arboretum, or, at least, are specially devoted to trees and shrubs. There are no trees remarkable for size or rarity, and many of the shrubs suffer from the effect of being planted in grass instead of in beds under cultivation. A very good collection of wild Roses particularly suffered from this treatment. This custom of planting isolated specimens of shrubs in the turf prevails in a number of German gardens, but in none of those seen did it seem to be satisfactory, except with such kinds as were of vigorous, coarse growth. It may be argued that they grow among grass or herbage in a wild state, but those who use this argument lose sight of the fact that in nature these shrubs and other plants flourish well only where they have congenial soil, situation and neighbors. Moreover, they often grow in considerable masses or clumps together, thus affording mutual assistance and protection in shading the ground and keeping down weeds and other possible intruders. Except under very exceptional conditions and among the strongest-growing species, wild Roses and other plants of similar habit are certain to suffer from having grass growing closely about their roots and stems; certainly to see these plants, as isolated specimens dotting the turf, produces anything but a natural effect, while the bushes lose the great advantage which is gained by even a very slight cultivation. In rich soils and in turf composed of some of the more slender kinds of grasses they may do better than any I saw.

It seemed singular not to find any conifers among the trees, and to see our Pines, Spruces, Firs, etc., growing in pots or tubs, as though they were tender sub-tropical or tropical exotics. The smoke and soot of the city are said to cause the death of these evergreen species in a comparatively short time if left in the open air during the winters. Every autumn they are brought into cold houses or pits for protection. I do not know whether protecting the plants by canvas caps, or otherwise, and allowing them to remain out, has ever been tried, but it would seem to be worth while making some experiments in this direction, because the item of storage of the plants is considerable. The only evergreen conifer in the garden, permanently growing outside, was a poor, forlorn-looking specimen of the Austrian Pine, which was sixteen or eighteen feet in height.

In labeling the plants some small porcelain or enameled labels are used; but most of the permanent labels are made of galvanized iron, zinc or wood, cut into oval shape and fastened to wooden or flat bar-iron stakes. The surface of these labels is painted white, and the lettering gives both the Latin and a best-known German popular name.

Arnold Arboretum. *J. G. Jack.*

## Is Grafting a Devitalizing Process?—I.

PROFESSOR L. H. BAILEY, of Cornell University, read a paper on this subject before the Peninsula Horticultural Society at its meeting last week in Dover, Delaware. A portion of it is printed below, and the remainder will follow in a subsequent issue:

To the popular mind the process of grafting is akin to magic, and entirely opposed to the laws of nature. It is mysterious, and seems to represent the extreme power which man exercises over natural forces. And yet the operation is very simple, and the process of union is nothing more than the healing of a wound. It is in no way more mysterious than the rooting of cuttings, and it is not so unnatural if by this expression we refer to the relative frequency of the occurrences of the phenomena in nature. Natural grafts are by no means rare among forest-trees, and occasionally the union is so complete that the foster-stock entirely supports and nourishes the other. Cuttings, however, are very rare among wild plants; in fact, I know of but one instance in which cuttings are made entirely without the aid of man, and that is the case of certain brittle Willows whose branches are easily cast by wind and snow into streams and moist places, where they sometimes take root. But the mere unnaturalness of any operation has no importance among phenomena attaching to cultivated plants, for all cultivation is itself unnatural in this ordinary sense.

Nor is the union of cion and stock any more mysterious or unusual than the rooting of cuttings; in fact, it has always seemed to me to be the simpler and more normal process of the two. A wounded surface heals over as a matter of protection to the plant, and when two wounded surfaces of consanguineous plants are closely applied nothing is more natural than that the nascent cells should interlock and unite. In other words, I do not see why two cells from different allied stems should refuse to unite any more than two cells from the same stem. But why bits of stem should throw out roots from their lower portion and leaves from their upper portion, when both ends may be to every human sense exactly alike, is indeed a mystery. We regard healing as one of the necessary functions of stems, but rooting cannot be so regarded.

I have said this much by way of preface in order to free your minds of any feeling which you may possess that grafting is in principle and essence opposed to nature, and therefore fundamentally wrong. A large part of the discussion of the philosophy of grafting appears to have been random because of this assumption that it is necessarily opposed to natural processes.

It does not follow from these propositions, however, that grafting is a desirable method of multiplying plants, but that the subject must be approached by means of direct and positive evidence. During the last three years the opponents of the system of grafting have made the most sweeping statements of its perniciousness. This recent discussion started from an editorial in *The Field*, an English journal, which was copied in *The Garden* of January 26th, 1886, with an invitation for discussion of the subject. The article opens as follows: "We doubt if there is a greater nuisance in the whole practice of gardening than the art of grafting. It is very clever, it is very interesting, but it will be no great loss if it is abolished altogether. It is for the convenience of the nurseryman that it is done in nine cases out of ten, and in nearly all instances it is not only needless, but harmful. If we made the nurserymen give us things on their own roots, they would find some quick means of doing so." Profuse discussion followed for a period of two years, in which many excellent observers took part. Some of the denunciations of grafting are as follows: "Grafting is always a makeshift, and very often a fraud." "Grafting is in effect a kind of adulteration. . . . It is an analogue of the coffee and chicory business. . . . Grafted plants of all kinds are open to all sorts of accidents and disaster, and very often the soil or the climate or the cultivator is blamed by employers for evils which thus originated in the nursery. . . . If in certain cases grafting as a convenience has to be resorted to, then let it be root-grafting, a system that eventually affords the cion a chance of rooting on its own account in a natural way." "Toy games, such as grafting and budding, will have to be abandoned, and real work must be begun on some sound and sensible plan." "Any fruit-bearing or ornamental tree that will not succeed on its own roots had better go to the rubbish-fire at once. We want no coddled or grafted stuff when own-rooted things are in all ways infinitely better, healthier and longer-lived." These sweeping statements are made by F. W. Burbidge, of Dublin, a well-known author, whose opinions command attention. The editor of *The Garden* writes: "We should not plant any grafted tree or shrub so far as what are called ornamental trees and shrubs are concerned. There may be reason for the universal grafting of fruit-trees, though we doubt it."

I have not cited these quotations in any controversial spirit, but simply to show the positiveness with which the practice of grafting is assailed. And as the presumption is in favor of any practice which has become universal, these statements possess extraordinary interest.

The reasons advanced for these denunciations of grafting are three, so far as I can learn. These are, (1) the citation of numerous instances in which grafting (by which I mean both grafting and budding) has given pernicious results; (2) the affirmation that the process is unnatural; (3) the statement that own-rooted plants are better—that is, longer-lived, hardier, more virile—than graft-rooted plants.

1. Citations of the injurious effects of grafting are usually confined to ornamental plants, and the commonly cited fault of the operation is the tendency of the stocks to sucker and choke the graft. This fault is certainly common, but, on the other

hand, there are numerous instances in which it does not occur, as, for instance, in Peach, Apple, Pear and many other fruit-trees, and in many ornamental trees. In fact, it is no more common, in the plants which have fallen under my observation, than is the pernicious suckering of plants grown from cuttings, as in the Lilacs, cutting-grown or sucker-grown Plums and many other plants, in which suckers must be assiduously kept down or they will choke the main stem which we are endeavoring to rear. These remarks apply with equal force to every citation which I have ever seen of the ill effects of grafting. The cases simply show that the operation has been a failure or is open to objections in the particular instances cited, and afford no proof that there may not be other plants upon which grafting is an entire success. For myself, I am convinced that grafting has been too indiscriminately employed, and it is apparent to every one that there have been many failures in the practice. But this does not prove grafting wrong any more than malpractice of physicians proves that the science of medicine is pernicious. If there are plants upon which grafting is entirely successful, then all must agree that the operation itself is not wrong, per se, however many cases there may be to which it is not adapted.

2. The proposition that grafting is unnatural, and therefore pernicious, is a fallacy. In the first place, there is nothing to show that it is any more unnatural than the making of cuttings, and if naturalness is proved by frequency of occurrence in nature, then graftage must be considered the more natural process of the two, as I have already shown. One of the most determined writers upon this subject has said that "it is quite fair to say that raising a tree from seed, or a shrub by pulling it in pieces (cuttings), is a more natural mode of increase than by grafting." I cannot understand by what token the author is to prove that pulling a plant in pieces is more natural than grafting; and there has been no attempt, so far as I know, to show that it is so.

But the whole discussion of the mere naturalness of any operation is really aside from the question, for every operation in the garden is in some sense unnatural, whether it be transplantation, pruning or tillage; and it is well known that these very unnatural processes may sometimes increase the longevity and virility of the plant. Plants which receive an abundance of food and are protected from insects and fungi and the struggle with other plants are better equipped than those left entirely to nature. It is the commonest notion that cultivation is essentially an artificial stimulus; that it excites the plant to performances really beyond its own power, and therefore devitalizes it. But this is a fallacy. All plants and animals in a state of nature possess more power than they are able to express, and they are held in a state of equilibrium, as Mr. Spencer puts it, by the adaptations of environment. Once the pressure of existing environments is removed, the plant springs into the breach and takes on some new feature of size, robustness or prolificacy, or distributes itself in new directions. The whole series of benefits which arise from a change of seed is a familiar proof of this fact, so that if cultivation, domestication, or, in other words, unnaturalness, may be sometimes a stimulus, it is not necessarily so. Cultivation differs from natural conditions more in degree than in kind. Or, as Darwin writes, "Man may be said to have been trying an experiment on a gigantic scale; and it is an experiment which nature during the long lapse of time has incessantly tried."

## Plant Notes.

### Some Recent Portraits.

THE new volume of the *Botanical Magazine*, the one hundred and fifth of the entire series, opens with a figure (t. 7212) of the great Iris of Lord Howe's Island, Moræa Robinsoniana, whose portrait has already appeared in these columns, and whose flowering last summer at Kew, for the first time in Europe, was one of the floral events of the English capital. The other figures are devoted to Chirita depressa (t. 7213), a native of China, an herbaceous plant with small bright purple flowers. This is a member of the family of Gesneraceæ, in which are many plants which have been wonderfully improved by cultivation, and it is not improbable that the present species may, with careful attention and selection, develop into a good garden-plant. Cirrhopetalum Thourasii (t. 7214), an interesting, although not very showy-flowered Orchid, upon which Lindley long ago founded the genus, and a native of Mauritius and the islands of the south Pacific Ocean. Iris Fosteriana (t. 7215), a bulbous species, discovered in 1884 by Dr. Aitchison in Afghanistan, where he found it growing plentifully at Badghis "in dry soil on the low hills at an elevation of three thousand feet above the sea-level." From a horticultural point of view this plant differs from all its allies in the variety of the colors of the different parts of the flower, the outer segments being bright yellow, with a spreading blade streaked with black, while the inner segments are bright lilac. The figure is from a plant which flowered in Professor Foster's garden at Cambridge, for whom Mr. Baker has named the species. Primula Poissoni (t. 7216); this is one of the new Chinese plants discovered by the Abbé Delevay, and raised in the Paris garden from seeds sent home by him. Like Primula Japonica and Primula imperialis, it produces superposed whorls of flowers; these are bright rosy lilac, and are produced in great profusion, the Kew plant from which the figure is made having produced eight scapes of flowers and flowered itself to death. The facility with which Primroses can be improved by cultivation is shown by the fact that the native specimens of this species are very small, with leaves only two or three inches long and a solitary slender scape with only a few flowers in a whorl, whereas on the cultivated plant the flower-stock was fully two feet high and as thick as a goose-quill.

## Foreign Correspondence.

### New Garden Plants of 1891.—II.

Stove and Greenhouse Plants.—Exclusive of Orchids, the best new stove and greenhouse plants introduced into cultivation last year must be credited to Kew. Few trade collectors think it worth while to pay any attention to foliage or flowering plants other than Orchids, for the reason that, as a rule, there is not much money in them. The botanical gardens in the colonies and numerous correspondents in various parts of the world, however, send to Kew various interesting and good decorative plants, and these are eventually distributed among nurserymen and others who desire to try them. Of the fifty or so new stove and greenhouse plants recorded the following are of most promise horticulturally:

Alberta magna.—Mr. W. Bull offered this plant in his catalogue of new plants for last year. It has been in cultivation several years at Kew, but, so far as I know, it has never yet flowered in England. It is rubiaceous, closely allied to Cinchona, which it resembles in habit and foliage; the flowers, which are small, are in dense panicles, and colored bright red. It will most likely prove a good greenhouse-plant, as it comes from a high altitude in Natal. The treatment which suits Luculia ought to answer for the Alberta.

Allamanda Williamsii, Hort.—Probably only one of the many forms of the variable A. cathartica, but differing from those previously known in gardens by its shrubby habit and floriferousness. It has been brought into notice by B. S. Williams & Son.

Aristolochia gigas, var. Sturtevantii, Watson.—This came to Kew from Mr. Sturtevant. It flowered freely in one of the tropical houses, and, so far at any rate as Europe is concerned, it was the most remarkable new plant of the year. It is named in compliment to Mr. E. D. Sturtevant, for reasons stated in Garden and Forest, vol. iv., p. 546.

Brownea Crawfordii, Watson.—This is a hybrid between B. grandiceps and B. macrophylla, which flowered at Kew last year, and was named in compliment to the late W. H. Crawford, of Cork, who raised it. In the size of the inflorescence and color of the flowers it is even superior to B. grandiceps.

Bauhinia Galpini, N. E. Br.—This is a most promising flowering-shrub for the warm greenhouse, which has been introduced to Kew from the Transvaal. It has two-lobed

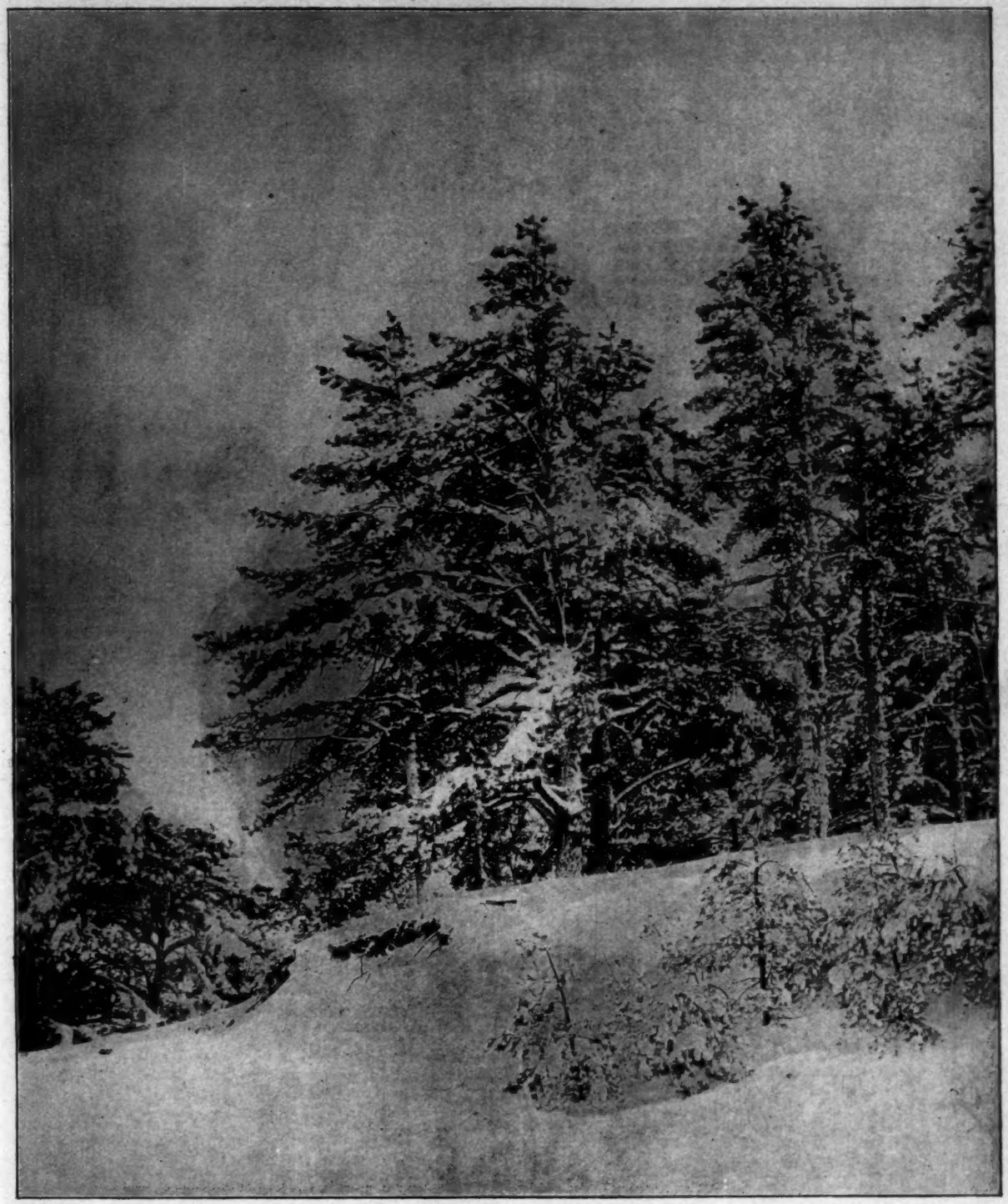

Fig. 9.—A New England Winter Scene.—See page 37.

leaves and crowded racemes of large handsome crimson flowers, borne on numerous twiggy branches. It grows to a height of about six feet. A figure of it was published in *Hooker's Icones* last year (pl. 1994).

CRINUM ROOZENIANUM, O'Brien.—This is said to be near C. Americanum, although the growth resembles C. erubescens. The flowers are four to twelve in an umbel, six to eight inches long, with recurved segments three to four inches long and three-fourths of an inch wide, white. It has been introduced from Jamaica by A. Roozen & Co., Haarlem.

COCOS PYNAERTII, Hort., is a seedling form of C. Weddelliana with very narrow leaf-segments. It was raised by Monsieur Pynaert, of Ghent, and figured in the *Revue de*

*l'Horticulture Belge* last year (p. 91, fig. 15) under the name of C. minima glauca.

Clivencharis pulchra, Hort.—It was stated last year that L. Van Houtte, of Ghent, had succeeded in raising a bigeneric hybrid from Clivea and Eucharis Amazonica, of which further detail would presently be published. Such a cross, if successful, cannot fail to be of exceptional interest.

Dipladenia illustris, var. glabra, is a handsome stove-climber with a woody root-stock, annual climbing stems, thick ovate leaves, and large rosy red flowers. It has been introduced from Brazil, and flowered at Kew last year.

Epiphyllum Gaertneri was introduced several years ago under the names E. Makoyanum and E. Russellianum, var. Gaertneri. It was at first supposed to be a hybrid between Cereus and Epiphyllum, but it now proves to be an introduction from Brazil and a third good species of Epiphyllum. It is a beautiful stove-plant, at least equal to the best of the many varieties of this genus grown, and at the same time abundantly distinct from them all. A figure of it was published in the *Botanical Magazine* (t. 7201).

Impatiens mirabilis.—This extraordinary species has lately been noticed in Garden and Forest. It is a native of Malaya, where it forms an erect, naked, succulent trunk four feet high, and as thick as a man's leg; leaves nearly a foot long, and large inflated, fleshy, golden yellow flowers. It flowered at Kew, and was figured in the *Botanical Magazine* (t. 7195).

Lilium Lowii, Baker.—This is a new species similar to L. nepalense, with white flowers. It has been introduced from northern India by Messrs. H. Low & Co. (See Garden and Forest, vol. iv., p. 352.)

Moræa Robinsoniana is not a new plant, but its flowering at Kew last year for the first time revealed its true character, which is that of a handsome floriferous Iris of exceptional dimensions. It is figured in Garden and Forest (vol. iv., p. 552.)

Nerine pancratioides, Baker, is a new edition to the genus which Mr. O'Brien has introduced from Natal. It has long narrow leaves, a scape two feet high bearing an umbel of from twelve to twenty flowers one inch long, with small square bifid scales between the filaments.

Primula imperialis, Jungh.—This is the gigantic Primrose from the mountains of Java, which was raised at Kew from imported seeds and flowered for the first time last year. It has a broad rosette of leaves each fifteen inches long by five inches wide, an erect scape three to four feet high, bearing whorls of deep yellow flowers.

Primula Poissonii, Franchet, is a new and beautiful species from Yun-nan which flowered at Kew in June last. It resembles P. Japonica in habit, but differs in the leaves and in the color of the flowers, which is rich rosy mauve with a yellow eye. A single plant of this species has produced no less than twelve scapes in one season.

Streptocarpus Galpini, Hook. f.—I described this in Garden and Forest, vol. iv., p. 534, from plants which have been introduced at Kew from the Transvaal. It is the prettiest of all the species of this genus.

Thrinax Morrisii, Wendl.—This was discovered by Mr. D. Morris, the Assistant Director at Kew, in the island of Anguilla, in the West Indies. It differs from all known species of Thrinax in the dwarfness of its stature, none of the many mature plants seen by Mr. Morris exceeding three feet in height. It has elegant foliage, and promises to be a useful garden Palm.

Tulbaghia Natalensis, Baker, is a Cape bulb with no more beauty than Mignonette, but, like the latter, it has the charm of delightful fragrance. It has been introduced to Kew from Natal. T. alliacea is cultivated for the sake of its purple flowers. Its linear leaves have a strong onion-like odor.

Wahlenbergia undulata, Cham.—A straggling herbaceous plant which may be grown in suspended baskets, so that its thin leafy stems may hang and display its campanulate deep blue flowers. It has been introduced from the Cape to Kew.

Among popular greenhouse-plants perhaps the most noteworthy additions last year were the beautiful dwarf Cannas, whose large richly colored flowers and good nature under ordinary cultivation have made them prime favorites in England. Two pretty Japanese varieties of Azalea amœna, hardy in England, were sent out by J. Veitch & Sons. This firm have also added many new varieties of greenhouse Rhododendrons and Hippeastrums.

Herbaceous Plants.—There was an extraordinary number of varieties of popular herbaceous plants introduced last year, such things as Dahlias, Gladioli, Pæonias, Carnations, Rudbeckias, Delphiniums and Irises being considerably reinforced by additional sorts of first-rate character. Of new species there were very few, the best of them being as follows: Chionodoxa grandiflora, a variety of C. Luciliæ with erect racemes and larger flowers than the type. It was previously known as C. gigantea (T. S. Ware & Co.) Galanthus Alleni, Baker. A pretty addition to cultivated Snowdrops, characterized by short broad leaves and pure white flowers (Caucasus). G. nivalis, var. Elsæ, Burbidge, a variety with larger flowers and broader leaves than G. Corcyrensis, from Macedonia. Another variety, named Racheliæ by Mr. Burbidge, has larger flowers than the last-named, and blossoms in October and November. Iris Fosteri, Baker, is a handsome species of the Caucasica group. It has yellow flowers blotched with deep violet. Lilium Brownii, var. chloraster, Baker, is a new introduction to Kew from western China, and differs from the type in having broader leaves, larger flowers, with a broad green midrib to each segment, and deep red pollen. L. Martagon × Hansoni, Baker, is a hybrid raised by C. G. Van Tubergen, Haarlem, from the two species indicated in the name. Watsonia densiflora alba is a very pretty Cape bulb which has so far stood out-of-doors at Kew, where it flowered for the first time last year. It has erect spikes eighteen inches high, with the flowers in a dense head like a ripe wheat-ear; pure white.

A Correction.—Miltonia vexillaria, var. Sanderiana. The plant to which I referred under this name in Garden and Forest (vol. iv., p. 545), and again in the list of new plants of 1891 (vol. v., p. 31), had, I find, been previously figured and described in *Revue de l'Horticulture Belge*, 1891 (p. 73), under the name of M. vexillaria, var. Leopoldiana, Reichb. f. "One of the prettiest and rarest of the varieties of this Miltonia is this which was dedicated by Reichenbach to Leopold II. It had been received by Monsieur Paynaert direct from Monsieur Paten, of Antioquia, in Colombia. It has been exhibited before the Horticultural Society of Belgium and the Royal Society of Agriculture and Botany at Ghent, and was unanimously awarded a certificate of merit."

London. *W. Watson.*

## Cultural Department.

### Christmas Roses.

It is only within the last few years that these charming hardy midwinter flowers have become so popular in English gardens, and curiously enough the desire on the part of a few specialists to arrive at something like finality in the nomenclature of Helleborus niger and its varieties, has been the means of bringing to light varieties unheard of previously. While the controversy was in progress distinct varieties were cropping up all over the country, each with its special markings, different time of flowering, etc. The varieties altifolius, major and angustifolius may perhaps be taken as the standard ones. They were pretty well known to the older botanists, and were the varieties usually found in general collections. To these have been added, within recent years, vernalis, Riverston, hybrid Caucasicus of gardens, the Bath variety, the Brockhurst variety, Madame Fourcade, St. Brigid, W. Brockbank, etc., some of them having probably been in gardens for many years, and grown simply as the Christmas Rose. The gathering of a collection together was the inevitable result of so much correspondence, the comparing and describing of which

has been very gradual. In addition to these, however, a host of new forms have cropped out as a result of selection from seedlings raised in this country, and also from the numerous importations that are now of annual occurrence. North Germany, the Austrian Tyrol and other well-known localities supply our markets, but so many equally good, if not better, forms are being raised from seed that we will soon be able to dispense with collected roots altogether. A collection of plants from the Austrian Tyrol, which we had the pleasure of going over in flower, were plentiful in forms resembling Madame Fourcade, Riverston hybrid and others, which led to the conclusion that all or most of these varieties were at one time or other imported.

Our chief difficulty with Christmas Roses in the open air in England, and which we suppose will be greatly aggravated in America, is the uncertainty of our season, especially midwinter, when the flowers are most in request. A simple covering of glass is of no use whatever, and if the flowers are wanted for cutting, and wanted clean, they must be grown indoors, and out of the reach of frost. We believe that when the plants are gently forced the flowers are larger and cleaner, and last considerably longer in water. A large group of Italian forms have shown beautiful flowers for many weeks now in the wild garden at Kew, and although invisible during frosty weather they are up as fresh and bright as ever when a change takes place. They have been here without any special cultivation for several years, and every winter brings a greater abundance of flowers, which are much admired by visitors. This mode of dealing with surplus stock will be found a very advantageous one even in private gardens, and large quantities of flowers for cutting could in this way be secured. Hellebores, at any rate the niger section, are gross feeders, and the question of manure, or no manure, in their cultivation, will depend largely on the nature of the soil in each particular locality. Where the soil is heavy and rich little or no artificial feeding will be required, but where it is light or sandy a sprinkling of heavy loam should be given in addition to the manure. In the latter soil, and in dry seasons especially, a mulching of leaves or other material during summer will be necessary. Where Christmas Roses are annually lifted and potted for greenhouse decoration it is essential to keep a double set, lifting them alternately, and never planting back those used for the house, until all danger from frosts is past, otherwise the young tender leaves are destroyed, and the plants greatly weakened.

Of the varieties of H. niger, altifolius, also called maximus, is one of the commonest in English gardens, and perhaps the finest of the whole niger group. When grown in shady sheltered situations the flowers come pure white, but where exposed they are shaded with rose on the outside, which, in our opinion, enhances rather than detracts from their beauty. The leaves are large, leathery, and the stalks as well as the flower-stems are deep purple.

Angustifolius is apparently an old garden-plant, the name being well known in Sweet's time. It was not, however, until 1876 that Miss Hope's variety was recognized as the true H. niger angustifolius. The flowers are quite three inches in diameter, white, and often tinged with rose on the outside; the leaf-divisions narrow, and the stalks and flower-stems green, sparingly spotted red. There are two other well-marked forms of angustifolius to be found in gardens. The Brockenhurst form, in which the leaf-stalks and flower-stems have scarcely a trace of purple markings, usually bears two flowers; the other, St. Brigid's Christmas Rose, has pure snow-white flowers somewhat cup-shaped, with flower and leaf-stalks of a rich apple-green.

The Bath variety is almost intermediate between H. niger and H. niger angustifolius. The flowers are large, flat, pure white; the flower and leaf-stalks spotted red, the latter slightly furrowed.

Caucasicus is a very misleading name, there being a species, H. Caucasicus, belonging to the Orientalis section. It has been widely distributed in England under the above name, and it is one of the most profuse-flowering varieties we possess. The leaflets are coarsely and sharply toothed, and much resemble the Italian forms; flowers pure white, tinged rose on the outside; the flower-stalk densely spotted red, and the petiole stout and deeply furrowed.

Madame Fourcade is a charming variety belonging to the altifolius set. The flowers are nearly three inches in diameter, pure white; the flower-stalk and petiole red-spotted, the latter slightly furrowed.

Of the variety major there appear to be a large number of forms in cultivation, although varying but slightly from the old type. The leaves are very massive, the flowers large, white, with a pale pink tinge.

Riverston hybrid might almost be classed as a form of angustifolius. It is said to be a hybrid, but we fail to find any justification for this statement. It is a robust plant, with flowers nearly four inches in diameter, white, tinged rose. The petioles are green, and the flower-stalks red-spotted.

Vernalis seems allied to the variety Caucasicus. The flowers are large, white, tinged rose; petioles green, deeply furrowed; the flower-stalk red-spotted. A useful form, and a free flowerer.

W. Brockbank, named as a fitting compliment to Mr. Brockbank, who has done much to make this family popular in England, is very distinct, remarkable in the flowers being so deeply cupped; flowers about three inches in diameter, pure white; petiole and leaf-stalk sparingly spotted.

There are numerous other forms equally desirable, but the above will suffice to show the wealth of hardy midwinter flowers within the reach of all.

Kew. *D. Dewar.*

## Seasonable Hints.

THE propagation of stock for the coming season is an operation that should be now looked after, the midwinter and early spring months being specially favorable for rooting many cuttings. Fine Cocoa-fibre is a very useful material in the propagating-frame, both for holding plunged cutting-pots and for use in such pots in place of soil or sand, since it retains moisture for a long time and is a good conductor of heat.

I have used this fibre successfully for a variety of cuttings, such as those of Pandanus Veitchii, Ananas, Ficus, Crotons, Calatheas, etc. It is also an excellent material in which to plunge freshly potted plants of delicate kinds, and is a cleanly and durable substance for such use.

Bouvardias now claim attention, whether the root-cuttings or tops are used. In the latter case the tips of the shoots alone are valuable, and these should be quite soft and succulent. It is a waste of time to put in hard cuttings of Bouvardias, and for most of the single varieties, with the exception of Bouvardia jasminiflora, the system of root-cuttings is the least troublesome.

Two excellent plants that should be included in all collections are Asparagus plumosus and A. tenuisimus. Their foliage is of special value for cutting, as it will keep in water for weeks. Unfortunately, A. plumosus is somewhat difficult to increase, as the cuttings seldom root satisfactorily, and division of the roots is a rather slow process, but if planted out in a greenhouse like Smilax it will sometimes seed, and then with reasonable care a stock may soon be secured. A. tenuisimus is readily propagated by cuttings, which may be made from almost any firm side-shoots, and will usually root in a few weeks.

Canna-seeds may be sown now, since there is an advantage in sowing them early, for sometimes they are rather obdurate about germinating. Many growers soak or scald these seeds, and some go to the extent of filing a hole in the shell in order to assist germination, but I have not found these processes necessary. When the seed-pans are placed in a warm house and plenty of moisture is given them I have lost but a small percentage of seeds. I have also tried soaking the seeds of various Palms for twenty-four to forty-eight hours before sowing, but have been unable to prove that much time can thus be saved in the period of germination.

The chief essential in the raising of Palms from seed is a moderately high temperature and fresh seeds, and little difficulty will then be found in inducing most species to germinate, though the time necessary for this varies greatly with different species. For instance, I have had seeds of Livistona Chinensis germinate in ten days, and I also have now some seeds of Attalea Cohune, the Cohune Palm, that have been planted for two and a half years, and, though perfectly sound, they show no sign of germination. These are, however, among the extreme cases, though some of the Kentias are also slow, the irregularity of their transmission from their native land probably having something to do with the variations in the time of growing, and it is very likely also that some of the seeds are not perfectly matured when gathered. Of course, the operation of raising Palms from seeds is an interesting one, either for the amateur cultivator or for the professional, but it is well to remember that the retail buyer of Palm-seeds may not be able to secure as fresh stock as the large commercial grower, and consequently he may not secure so good a result.

The cleaning of any insect-infested plants should receive attention before the spring potting is done, so that the plants will be in condition to go forward; this precaution is especially

applicable to Palms. Fumigation with tobacco-stems is the best preventive for green-fly and thrips, and should be applied at regular intervals.

Holmesburg, Pa. *W. H. Taplin.*

## Begonias.

AMONG the numerous new Begonias of the shrubby section introduced recently, the crosses between B. Olbia and B. rubra seem especially striking, handsome and useful. Souvenir de F. Gaulain, President Carnot and Bismarcki are somewhat similar in general effect, the former having the darkest flowers and the latter the lightest. The leaves are long, finely notched and satiny, emerald-green above and reddish beneath. While similar in general effect, they have marked distinctive qualities. President Carnot is especially attractive, the upper part of the leaves being suffused with a reddish bloom, which has a very handsome effect. The flowers of all the varieties are large and borne in profusion. They are rather tall-growing subjects, but the limited space at my disposal will not allow me to let them grow to ascertain whether they possess the vigor of B. rubra. Apparently, they would be intermediate in size between the parents if well grown.

Hybrids and seedlings of B. metallica do not seem any great improvement on the parent as far as tried. B. metallica is one of the best of foliage-plants, free-growing, with a distinct character in its well-marked veins. The hybrids all have a weakly pallid look from absence of the strong veinings, and do not seem to have gained in freedom of flowering. These remarks especially apply to B. cuprea and B. velutina, which are seedlings. B. pictavensis, one of the new hybrids (with B. Scharffiana), is rather better, but does not, to me, seem as attractive as the latter parent.

In the tuberous section the most important offering this year is a new fragrant species, B. fulgens, by the Messrs. Lemoine. As tuberous Begonias are invaluable for greenhouse decoration in summer, the infusion of a distinct fragrance to the present hybrids will be a great gain. There seems a premonition of a great boom in hybrid tuberous Begonias this year for bedding purposes. Certainly they have their uses for that purpose, and well-selected kinds, started in a cool place and brought on slowly, average very well as out-of-door flowers if carefully staked and given proper attention. I think, however, that no one who has grown them largely will consider them a satisfactory bedding plant in the same sense that the Geraniums are satisfactory—that is, as always reliable growers, producing a maximum of effect with a minimum of care. Even the sturdiest of them require staking, as the hold of the shoots on the bulbs is of the slightest, so that a wind will twist them off, and the black rust, or some fungus, is very partial to the shoots in certain conditions of the soil. If bedding effects are attempted, reserve plants should be grown to replace losses. As wet-weather flowers they are certainly superb, remaining in perfect condition after rains which entirely wash out ordinary flowers. To those not addicted to the bedding-habit, and who are not quite satisfied with mere big flowers, may be commended the tuberous species, which, without exception, are all charming, each with character peculiar to itself. It is singular that, as a race, tuberous Begonias are free from objectionable colors. Only when crossed with B. Socotrana have I noticed any magentas; but this color is, I think, never found among the summer-flowering kinds.

Elizabeth, N. J. *J. N. Gerard.*

## Winter-flowering Aquatics.

WATER-LILIES are naturally summer-flowering plants, but it is no longer a matter of question that their loveliness may be enjoyed in the depth of winter. I have never been without flowers of Water-lilies of some varieties since the closing of the season for them out-of-doors; and in the greenhouses at Prospect Park, Brooklyn, many beautiful flowers were to be seen at Christmas-time and into the new year. As it is the aim of the managers, however, to have flowers for the summer decoration of the park lakes, the temperature of the houses where the Water-lilies are now placed has been lowered to induce rest, otherwise they would have kept on blooming, and as it is, there are yet flowers, though fewer in number and smaller in size. An amateur in the vicinity of the park has a unique water-garden where tropical Nymphæas are always in bloom, and other aquatics are seen in summer luxuriance. These tropical varieties of Nymphæa are the ones suitable for winter-flowering, and plants which have been grown in tubs or tanks out-of-doors will continue to bloom through the winter months if placed in water where the temperature does not fall below sixty-five degrees. In the stove-house but little pipe is needed in a tank to keep it at a temperature of seventy degrees. The difficulty I have experienced with heated tanks is that they become too warm. Plants of the Zanzibar Water-lily, of the blue Lotus of the Nile (Nymphæa cœrulea) and of N. scutifolia will do well in tubs where tanks cannot be provided, but, of course, the latter are preferable where space can be secured.

An essential point in the cultivation of Water-lilies in winter is to get all possible light and sunshine. A tank from twelve to fifteen inches deep will suffice for planting out winter-blooming Lilies. These should be specially selected—that is, they should be either seedlings of the type of Nymphæa Zanzibarensis or of plants somewhat retarded during the early part of the season. The night-blooming varieties will flower well and remain open a great part of the day. A tank eight feet wide and eighteen inches deep would require, perhaps, a two-inch pipe, although I find a one-inch pipe too large in a tank sixteen feet long, four feet wide and eight inches deep. Eighteen inches would be deep enough for immersing tubs. The soil used should be thoroughly rotted manure and rich loam, as has been recommended for outdoor planting. So far as I have observed, Water-lilies are quite as fragrant in winter as in summer, although in winter the blooms may be smaller where they do not enjoy the most favorable conditions.

Aponogeton distachyon is another useful winter-flowering water-plant which will bloom freely in an ordinary greenhouse. Another is Pistea stratiotes, a pretty floating plant, with light green woolly foliage, which is always attractive. Richardias, or, as they are commonly called, Callas, can be associated with other aquatics, and their flowers give a charming effect to the water-garden in winter. Azolla Caroliniana (Floating Moss) is an interesting plant, and so is the Water Hyacinth and the Parrot's Feather (Myriophyllum), but they are better in greenhouse temperature, to check too rank a growth. Cyperus alternifolius is useful in connection with flowering aquatic plants, very ornamental anywhere, and good for cutting purposes. The Egyptian Papyrus, too, is a most graceful plant for greenhouse decoration, and should never be omitted from the winter water-garden.

Where there is space for groups of ornamental foliage-plants like Palms, Cordylines, Crotons, Dracænas, Marantas, etc., a delightful background can be made in winter, especially for a tank of irregular outline on the ground level or slightly raised above it. This, however, needs a large house, so as to afford ample light, say, sixty by twenty-five feet, and larger. Of course, there is no end to arrangements which can be made with these and other plants with decorative foliage, while Ferns and other low-growing things can be used on the water's margin or to carpet the naked ground.

Dongan Hills, N. Y. *Wm. Tricker.*

## Citrus trifoliata as a Hedge-plant.

THE proved hardiness of this plant, even in the north-west, makes it certain that for the purposes of a defensive hedge it is more completely adapted than any plant yet introduced. Its dense and compact habit of growth and armament of long spike-like spines, pointing in every direction on the rigid branches, soon make it impenetrable even by the tough-skinned razor-back hog of the south, to which a barbed wire fence affords a pleasant irritation. In reply to a letter concerning this plant, Mr. P. J. Berckmans, of Augusta, says: "I have fruited Limonium trifoliatum (?) nearly ten years, having introduced the first plant from Japan in 1873, and have grown yearly since a large stock of it. I have also a hedge of it nearly half a mile long. We have advertised it as a hedge-plant for several years past, but have been unable to raise enough to fill the demand so far, owing to the scarcity of seed." Mentioning this to a friend to-day, he remarked that Florida ought now to be able to furnish all the seed needed, and he added that twelve to fifteen bushels of these little oranges went to waste on his place at Lake City last autumn, and if the proper effort was made any quantity of the seed could be had in Florida.

The fact that this plant is a member of the Citrus family has deterred many people at the north from making experiments with it, but wherever planted I have so far heard of no injury to it from cold, and if the experiment stations in all the northern states would test it thoroughly the degree of cold it can endure may soon be determined. In my own experience ten years ago a temperature of eighteen degrees below zero at night, and four degrees below at noon, with bright sunshine, did not injure young plants in the slightest degree. The compact and dwarfish habit of the plant will make a hedge of it much more easy to keep in shape than the rank and unruly Maclura, and the ornamental character of its sweet flowers,

and the profusion of its golden fruit in October, will render a hedge of it very attractive. As a single specimen on a lawn it is an object of rare beauty.

Raleigh, N. C. *W. F. Massey.*

[Citrus trifoliata produces flowers and fruit in sheltered positions in the neighborhood of this city; but it is not sufficiently hardy in the northern Atlantic states to be used successfully as a hedge-plant. In New England it is generally cut to the ground every winter, and does not flower. It would be interesting to know in what part of the northwest its hardiness has been proved.—ED.]

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**The Pin Oak** (Quercus palustris) abounds here in its wild state, and, whether wild or planted, it commands universal admiration. The downward tendency of the lower tiers of branches and the finely divided, shining green leaves give it a distinct appearance among other Oaks, and its rapid growth should commend it to all planters. One reason why the various Maples are so largely used is that they can be transplanted easily and successfully. It ought to be more generally known that the Pin Oak may be transplanted with just as much safety as the Maple. I have seen long avenues planted with good-sized Pin Oaks without the loss of a single tree. Those familiar with the roots of various Oaks know how this species differs from most other Oaks in this particular. The Pin Oaks have a mass of fibrous roots instead of the few prong-like roots of most other kinds. Practical planters make all Oaks live by pruning them judiciously. The Pin Oak has the advantage of needing but very little pruning, because its numerous roots will carry it through even if the branches are not shortened in.

Germantown, Pa. *Joseph Meehan.*

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## Correspondence.

### The Senecios of the Canary Isles.

To the Editor of GARDEN AND FOREST:

Sir,—I notice with pleasure in Number 192 of your journal that Mr. Watson invites attention to the long-neglected Senecios of the Canary Islands. In the spring of 1884 I had the opportunity of admiring these charming flowers growing at the feet of ancient Laurels in the gorges of the Canaries. This archipelago is the true home of that class of Cinerarias or Senecios, for which Webb proposed the new generic name, Pericallis.

In my *Specilegium Canariense* (see *Engle's Botanisches Jahrbücher*, 1887) I have enumerated half a score of different forms, but the principal types of interest to us now are the following:

1. Senecio appendicularis (syn. S. populifolius) is distinguished by its leaves, which are deep green above and of a cottony white color beneath, and resemble altogether the leaves of the White Poplar. The corymbs are very dense, and the flowers almost always white.

2. S. Heratieri is a slender plant, almost rampant, with few-flowered, often one-flowered corymbs, but with large, bright rose-colored flowers. This is a plant of the mountain of Teneriffe, growing at an elevation of about 6,000 feet, and never attaining the slender, many-flowered habit shown in the figure on page 509 in the above-mentioned number. It is a plant long cultivated, but its native land is not, as Mr. Watson states, the island of Madeira. It is peculiar to Teneriffe. The only plant of this group found on Madeira (see the excellent catalogue of the plants of Madeira by Monsieur E. Casson in the *Bull. Soc. France*, 1868) is the S. Maderansis, which is akin to S. appendicularis, but still differs considerably from that species.

3. S. Tussilaginus is very common in shady places on the Canary Islands; it is slender, with firm branches and very large leaves, and spreading corymbs composed of bright rose-colored flowers. This plant is probably the parent of our cultivated Cinerarias and of numerous varieties. The wild type is very inconspicuous as compared with our greenhouse Cinerarias.

4. S. papyraceus is confined to the bay-woods of the Ile de Palma, and is a very remarkable species, two feet to two feet and a half high, with superb, dark, shining foliage, and irregular corymbs composed of about a hundred flower-heads of a brilliant rose-carmine color. One must see this truly admirable plant in order to realize how the resplendent flowers glow like fire in the deep, sombre shadows of Canarian trees like the Phœbe Barbrisana and Oreodaphore fœtans. The plant, through its great beauty, has become the favorite flower of the inhabitants. Every child of Palma knows it by the name Cima, and in Spain one often hears this refrain:

> Todas las flores se crian en Mayo
> Menos la Cima que no se hallo.

This effective plant would be an acquisition, and it would ripen its seeds readily in our cool greenhouses.

5. S. cruentus is the loveliest of all the gems of this beautiful genus. I could hardly express my pleasure and surprise when I first noticed at a distance this superb plant at the foot of old Perseas, above La Florida, at an altitude of more than 5,000 feet. It is quite slender, fifteen to eighteen inches high, with large radical, reniform leaves of a clear purple tint. Branches, leaves and all, even the hairy down of the leaves, were of this color. It is altogether unique in its way, glittering like a flame, and visible at a considerable distance. The flowers have the same color, disposed in irregular corymbs, which are small for the genus. This is a plant whose vegetative parts have assumed a pure luminous color which properly belongs to the corolla only. What a welcome would it receive in our gardens if it would always retain this color when raised from seeds. But the seeds which germinated with me at Bâle produced both green and red plants, quite different from their mother-plants. For all that, I do not doubt that by a careful selection it is possible to obtain and maintain the beautiful race that exists on Teneriffe; it is a plant by the side of which Lobelia cardinalis seems really dull and insignificant.

I am sure that nothing could be more interesting and meritorious than the propagation by means of seeds of these admirable Senecios in your gardens. In the southern states, in Carolina, in Georgia, I am sure that they could live in the open air, for on Teneriffe they are found at an altitude where it is quite cold during the winter. There is nothing easier than to obtain the seeds through the numerous inhabitants that take interest in the flowers of their charming country.

I mention only Mr. Wildpret, the gardener of a beautiful garden of acclimatization in Orataba, W. Teneriffe, and Dr. Perez, of the same place. I may add that just as Madeira has only one species of these plants, the Azores also possess one species in the very pretty S. malvæfolius, a rather large plant with rich corymbs of bright crimson-colored flowers, which I received through the kindness of Dr. Bruno Carreire, of Ponta Delgoda, on the isle of St. Michel.

The botanists who read this little article, the object of which is to draw the attention to a series of plants, charming, but much neglected, will find a complete enumeration of all the forms and species in my *Specilegium Canariense*, pages 147 to 149.

We may venture to hope that, through the introduction of natural forms of Senecio, we shall be able to obtain new and remarkable hybrids to enrich the list of varieties that already exist in our gardens. S. appendicularis is capable of producing astonishing results, as its beautiful leaves are much whiter beneath than those of any other plant I am acquainted with.

Bâle. *H. Christ.*

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### Plants for the Sea-shore.

To the Editor of GARDEN AND FOREST:

Sir,—With the ever-increasing summer exodus of sea-lovers comes a demand at the different resorts, each succeeding season, for more pleasant and varied surroundings. In planting to any large extent along a shore large consideration must be had for plants which have survived and flourished among such unpropitious surroundings. In early August I made a few observations on the flora of Barnegat Peninsula, and I hope a record of them may invite attention to some of our plants which flourish in sand, and in salt-laden breezes.

Barnegat Peninsula, a strip of shifting beach, from a quarter to half a mile wide, extending from Bayhead, New Jersey, to Barnegat Inlet, is evidently of bar-formation. The long sandy barrier grew in early times, and Barnegat Bay was closed off from the ocean. It was instructive to observe the efforts of Nature to clothe the sterile landscape with vegetation. The final attempt seemed to have been made here under conditions very unfavorable to vegetal growth. The salt-grasses and salt-water sedges apparently appeared first, preparing the way for the reception of species more fastidious. Some few plants seemed peculiarly adapted to such a hard fare. The Bayberry, or Waxberry (Myrica cerifera), was singularly attractive. It formed dense thickets, inhabited by the mosquito and the shy cotton-tail rabbit. The leaves, when rubbed, were aromatic, and the tough stems and twigs were covered with waxy grayish white berries, which make the plant valuable for ornamental uses on the sea-shore. The

berries are gathered at times by the plain fisher-folk here, and boiled over a slow fire. The wax rises to the top, and is then skimmed off and cooled into the required form. Candles of bayberry were no infrequent commodity in rural communities during Revolutionary days.

The Poison Dogwood (Rhus venenata) disputes the ground with the Bayberry. Dense masses of this poisonous shrub were seen everywhere, bearing compact panicles of yellowish white unripe berries, while over the exposed sand-dunes trailed the much-dreaded Poison Ivy (R. Toxicodendron). The dark glossy pinnate leaves of the former turn to the most vivid and attractive hues, and are much collected and admired for their autumnal coloring. R. venenata, with white berries and conspicuous autumn foliage, however, is exceedingly dangerous and virulent. Notwithstanding the bad reputation of the two plants, they are important as conservatives in nature. The drifting sand is anchored; skurries of sand are prevented, and an otherwise inhospitable neighborhood is made inhabitable. Once familiar with the Sumachs, and remembering that those species only are poisonous which have white berries, one can go into the woods with impunity and collect anything herbaceous, shrubby or arborescent without fear.

Rosa lucida grew also in this sea-shore tangle, and the half-ripe hips, tinged orange, glistened in the sunlight. Associated with these species, twisted into fantastic shapes by the wintry storms, and scrawny for want of sufficient nourishment, stood the cosmopolitan Red Cedar (Juniperus Virginiana). Some botanists hazard the opinion that the Bermuda Cedar is only a geographical variety of the Savin of North America. It is recorded in Garden and Forest (vol. iv., p. 290) that a tract of ground in the Bermudas is covered with Bermuda Cedars of large size, springing from a dense undergrowth of Wax Myrtle or Myrica, identical with the species so common on our Atlantic seaboard, and of Baccharis, similar to, although distinct from, our seaboard species, and of Pteris aquilina. I found the Red Cedar on Barnegat Peninsula, with the Wax Myrtle, with Baccharis halimifolia and with the Bracken (Pteris aquilina). It seems, therefore, that the two Cedars keep the same company at least.

With this impenetrable jungle as a background, and almost buried in the salt-water sedges and grasses, the Rose Mallow (Hibiscus Moscheutos) covered the meadows and more elevated hummocks with brilliant pink flowers, while Golden-rods and Sabbatias, in close masses, occupied the foreground. The landscape, so desolate and depressing, was thus transformed into a large unkempt garden, flavored by the salt of the ocean. For those who wish to see some vegetation as a relief from the everlasting glitter of sand and water, these native settlers offer more than a hint for the proper making of a planting list.

Philadelphia, Pa. *J. W. Harshberger.*

## Chamæcyparis squarrosa.

To the Editor of Garden and Forest:

Sir,—Last autumn I saw in Kew Gardens a small tree with beautiful feathery, bluish gray leaves, labeled "Chamæcyparis squarrosa." I do not find this particular variety of Chamæcyparis in the books or catalogues. Is it obtainable from nurseries here? Many evergreens fail with me on exposed hills of Staten Island, and I should like to know if this one would probably prove hardy?

Staten Island. *J. M. N.*

[This plant, which is an abnormal form of the well-known Japanese Chamæcyparis obtusa, is usually met with in nurseries, where it is now common, as Retinospora squarrosa. It is a rather freer-growing plant and quite as hardy as the other forms of the Japanese Chamæcyparis or Retinospora.—Ed.]

## Recent Publications.

*Preliminary Report on the Native Trees and Shrubs of Nebraska.* By C. E. Bessey. Bulletin of the Agricultural Experiment Station of Nebraska, vol. iv., article iv.

The territory embraced in the state of Nebraska is, with reference to its native silva, one of the most interesting portions of the United States, occupying as it does a mid-continental position between the two great natural forest-regions of the east and the west. A considerable number of the species of the forests of the Atlantic seaboard extend to the eastern confines of the state, while others descending from the slopes of the Rocky Mountains reach the eastern limits of their distribution within its borders.

The list prepared by Professor Bessey contains no less than sixty-one native arborescent species, a surprisingly large number when it is remembered that, apart from the Cottonwood and Willow-lined streams, the woods are confined to the extreme eastern and the extreme western borders of the state, the central, and by far the larger part, being treeless.

From carefully prepared tables of the distribution of the different species at different elevations, and in different parts of the state, Professor Bessey reaches the conclusion that "nearly all have probably migrated to the plains from the east," and that many of them have not "done more than to get a little foothold in the extreme south-eastern counties, to which they have come from the heavy forests of Missouri. A few have doubtless crossed the Missouri River from western Iowa, although this number is evidently very small. Nearly all our trees have come up the Missouri bottoms and spread from the south-eastern corner west and north-west. Possibly a few have come up the Blue River from Kansas, but these must eventually be traced to the Missouri River bottoms at the mouth of the Kansas River." Of the plants which have traveled from the west the Buffalo Berry (Shepherdia argentea) appears to be the only one that has spread over the entire state; although the western Shadbush (Amelanchier alnifolia), a denizen of a considerable portion of western America, is found as far east as the shores of the Great Lakes. But the number of western trees and shrubs now found within the state is certainly small, considering the facilities for their transport, and, as Professor Bessey suggests, "it is singular that so few of the western plants have come down the streams, especially as prevailing winds are also from the westerly parts toward the east," and it would have appeared "much easier for the western trees to come down-stream, and with the wind, than for the Elms, Ashes, Plums, etc., to have gone up the streams against the prevailing winds." But this is explained by the supposition "that eastern conditions are slowly advancing westward; and that such climatic and other changes are slowly taking place upon the plains as favor the eastern rather than the western trees," which now appear to be slowly retreating, while eastern species are slowly pushing their way westward.

The results of Professor Bessey's investigation are of particular interest and value in the new light which they give upon the distribution of several of our trees. A comparison of his paper with the ninth volume of the *Final Reports of the Tenth Census*, in which all the information available ten years ago about the distribution of the trees of North America was supposed to have been collected, shows that the range of not less than twenty-two Nebraska trees was inaccurately given in that work. Pinus ponderosa, which was then believed not to grow naturally farther east than the Black Hills of Dakota, is now known, as Professor Bessey has pointed out in an earlier publication, to extend along the Niobrara River to Long Pine Creek, in Brown and Rock counties; it also occurs on the North Platte as far eastward as Deuel County and in the valley of the Loup in Valley, Greeley and Custer counties. It grows at the highest elevations in the state, ranging from over 5,000 to about 7,000 feet above the level of the ocean. Fine trees are still abundant upon the slopes and summits of rocky hills in the northern and north-western portions of the state, although the best and most accessible of the Nebraska pine has already fallen to supply the wants of the settlers.

The White Oak (Quercus alba), believed to have been arrested on the west by the Nodaway River, in Missouri, is now shown to reach Cass and Nemaha counties, in south-eastern Nebraska, where also occur the Red Oak (Q. rubra) and the Scarlet Oak (Q. coccinea), whose western range was not supposed to extend farther than western Iowa. The Ironwood, or Hop Hornbeam (Ostrya Virginiana), Professor Bessey has found in several of the eastern and northern counties, although eastern Iowa was given in the Census Report as the limit of its range westward. The fact that the Canoe Birch (Betula papyrifera), the Western Birch (B. occidentalis) and the River Birch (B. nigra), all occur in Nebraska, is for the first time shown in Professor Bessey's catalogue, in which are included the Butternut (Juglans cinerea), the Shellbark Hickory (Hicoria ovata), the Big Shellbark (H. sulcata), none of which were credited to Nebraska in the Census Report. The number of Poplars is increased by the discovery that the Aspen (Populus tremuloides), one of the few trees which occur on the two sides of the continent, extends as far south as Nebraska, where it has been noticed in the north-western and in the south-eastern counties, and that the narrow-leaved Rocky Mountain Poplar (P. angustitolia), not known before east of the Black Hill region in Dakota, really reaches Nebraska. The Papaw (Asimina triloba) and the Dwarf Sumach (Rhus

copallina) are found to grow in the extreme south-eastern part of the state, and the Little Rocky Mountain Maple (Acer glabrum) in Sioux County, in the north-west. The Sugar Maple (A. barbatum) and the Red Maple (A. rubrum), which were credited to eastern Nebraska in the Census Report, are now said not to grow naturally in any part of the state, although it seems probable that the second of these trees may yet be found near the borders of some of the streams which flow through the south-eastern counties into the Mississippi. Other additions to the Nebraska silva are the Witch Hazel (Hamamelis Virginiana), the Indian Cherry (Rhamnus Caroliniana), the Mountain Mahogany (Cercocarpus parvifolius), a widely distributed Pacific species, the Western Choke Cherry (Prunus demissa), the Sheepberry (Viburnum Lentago), and the Red Ash (Fraxinus pubescens).

These facts show the importance of Professor Bessey's investigation, and how much there is still to be learned about even such an apparently simple matter as the distribution of some of our most common and best-known trees. They show in particular the necessity of a careful study of the vegetation of the mid-continental region, in which are mingled plants of the east and of the west, and in which many eastern species finally disappear, and a few western species find the eastern limit of their distribution. Professor Bessey's report suggests that there is still much to be learned of the distribution of trees in the two Dakotas, in Kansas, in the Indian Territory and in Texas; and it is to be hoped that botanists living in those states, and with facilities for collecting facts about their vegetation, will follow the example of the Professor of Botany of the University of Nebraska, and make public the results of their observations.

Much remains, too, still to learn of the distribution eastward, in Idaho and Montana, of several trees of the north-west coast, and of the northern and eastern distribution of the trees of British Columbia, whose silva, in spite of the good field-work and excellent reports of Dr. Dawson and Professor Macoun, is still very imperfectly known.

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*Electricity in Agriculture* is the title of bulletin No. 16, lately prepared by Mr. Clarence D. Warner, Meteorologist of the Massachusetts Agricultural College Experiment Station. In vol. ii., p. 442, we published the results of some experiments made at Cornell University which seemed to strengthen the opinion that electric light might be of advantage in some branches of horticulture. The experiments in Massachusetts, however, have nothing to do with light, but they are an attempt to show that electric currents passing through the ground and atmosphere have some influence on vegetation. As this is the first of a series of bulletins, it includes a brief résumé of what has been done by former experimenters, and Mr. Warner prefaces this historical sketch by the statement that the currents of sap which are carried through the rootlets, stalk and leaves of the plant depositing the elements of plant-food in their proper places are due to electricity, a theory which can hardly be considered as established. He adds, that since the plant at night is generally covered with dew it becomes a good conductor for electrical currents, which convert in their passage soil elements into plant-food and stimulate the sap to gather up the dissolved elements and carry them to their proper places. He thinks it probable, therefore, that this accounts for the fact why most plants grow more rapidly during the night than during the day.

The history given of the earlier experiments is briefly this: In 1845 plates of copper and zinc were placed in the soil where plants were growing and connected by a wire, but these efforts were fruitless of results. In 1847 Hubeck, in Germany, surrounded a field with a network of wires, and concluded that seeds germinated more rapidly and buckwheat gave larger returns. In all other cases electricity produced no result. Other men of science carried on experiments with negative results, and the abandonment of the project of applying electricity to agriculture was advised. Some years later Fichtner used a battery with effect. Parallel wires were placed in the soil, and between the wires Peas, Grass and Barley showed an increase of from thirteen to twenty-seven per cent. when compared with ordinary modes of cultivation. Fischer, of Waldheim, placed metallic supports to the number of sixty around each hectare (about two acres and a half), and at the summit of the supports were electrical accumulators in the form of crowns surmounted by teeth, which were united by metallic connection. The result appeared to increase the crop of cereals by one-half. Plates of zinc and copper, alternately placed about a hundred feet apart and connected two and two by a wire, were said to increase twofold to fourfold the production of certain garden-plants. Fischer stated that it was proved that electricity aided in breaking up the soil constituents, and he stated that plants under this treatment matured more rapidly, were more healthy and were not affected by fungoid growth. In later experiments by Specnew, seeds were submitted to the action of an electric current, with the result of hastening germination and better-developed young plants than those grown from non-electrified seeds. The current did not affect the yield. At Kew Gardens plates of copper and zinc were placed in the soil so as to make a battery of zinc, earth and copper, with the result of increasing the crops of vegetables. Other experiments made in Pskov, in Russia, at the School of Forestry in Nancy, France, and other places, seemed to indicate that an electrical current could be profitably employed in not only garden and field crops, but that Grape-vines subjected to this treatment yielded fruit with a larger percentage of water and sugar and a lower percentage of undesirable acid.

The following experiments were made in the greenhouse at Amherst: Rectangular frames were made three feet long by two feet wide, across which were run copper wires in series of from four to nine strands, each series separated by a space of four inches, and the strands by a space of half an inch. The frames were buried in the soil so that the roots of the plants would come in contact with the wires, with the supposition that the currents of electricity passing through the wires would decompose into its constituents the plant-food near the roots and prepare it for the plants. Two electric gardens were thus prepared and furnished with a battery arranged to allow continuous currents through each series of wires. Near each electric garden was a plot prepared in the same way, except that it lacked the electrical apparatus. These gardens are designated as *A* and *B*. The soil was carefully prepared for Lettuce, and were placed where much trouble from mildew had been experienced, in order to test the effect of electricity upon the fungus. In garden *A* fifteen Lettuce-plants of the same size and vigor were set over the wires, the plants well cared for and the current kept continuous. The experiment began the 1st of January, and on the 1st of April five of the plants had died from mildew; the others were well developed and the heads large. The largest heads were over the greatest number of wires and nearest the electrodes. It appeared that the healthiest plants as soon as the currents became feeble or ceased would be affected by mildew. On examining the roots of the plants it was found that they had grown about the wires, as if they found there the greatest amount of nourishment. The roots appeared in no way injured by the current, but rather benefited by the electrical influences. Beside this garden was one of the same dimensions, used as a check, having the same kind of soil, and treated in the same manner as the first, except that the electrical apparatus was wanting. At the close of the experiments only three plants had partially developed; two of these were nearly destroyed by mildew, and only one of these was free from disease. In the second garden, *B*, twenty plants of the same variety of Lettuce and equal size were taken and treated the same as in *A*. * At the close of the test only five plants were free from mildew, seven died before they were half-grown, the rest were well-developed, but in the last part of the experiment they began to be affected. Several heads were large, the largest being over the greatest number of wires and nearest the electrodes. Near this plot were twenty other plants subjected to like conditions, but without electricity; all but one died from mildew before they were half-grown. The solitary survivor only developed partly at the close of the experiment, and was badly affected with the disease. The general result was that the plants subjected to the greatest electrical influences were hardier, healthier, larger, had better color, and were less affected by mildew than the others. Experiments were made with various Grasses, but no marked results were obtained.

Mr. Warner concludes: "It would seem that electricity is one of the agents employed by nature to aid in supplying the plant with nourishment and to stimulate its growth. To what extent plants may be subjected to electrical influences, or what strength of current is best suited, and what currents may prove detrimental to their development have not been determined, but it is desirable to continue this research until some definite information shall be gained on these points. Experiment alone can determine whether different varieties of plants differ in their capacity for enduring the action of electrical currents without injury." Mr. Warner also suggests that there may be a limit reached where electricity would completely overcome the attack of mildew and stimulate plants to a healthy and vigorous condition throughout their entire growth. We may add that if electricity is so potent in giving vigor to Lettuce it might under certain conditions give equal vigor to the mildew

and other parasitic plants. We shall look with interest to further reports on this matter, and trust that they may be carried on in the true scientific spirit, and without any attempt to establish previously formed judgments.

## Notes.

At the last meeting of the Massachusetts Horticultural Society the Honorable Ephraim W. Bull, of Concord, was made an honorary member of the society. This was a well-merited, though somewhat tardy, compliment to Mr. Bull for his distinguished services as the originator of the Concord Grape.

The Executive Committee of the American Carnation Society announces that its first annual meeting will be held at the Tift House, Buffalo, New York, on the 16th of February. There will be an exhibition of flowers of the older and newer varieties, and many interesting papers on the Carnation, its diseases, its history and its cultivation.

A recent writer, in speaking of the town of Walmer, in Cape Colony, says that the Christmas decorations in its little church were the most beautiful she had ever seen. They consisted simply of magnificent blue Water-lilies and the large pure-white Arums, which the colonists unpoetically call "Pig-lilies," combined with the glossy foliage of the Arums and a few great Fern-fronds.

The fruit crop of last year in Iowa was unusually good, and the fruit-growers there feel much encouraged in spite of the suffering of this industry from severe winters in recent years. The display of apples at the meeting of the State Horticultural Society last week was remarkable for its size and quality. The society resolved to do everything in its power to make a creditable collection of Iowa fruits for the Columbian Exposition next year, and the Hon. C. L. Watrous, of Des Moines, was selected to superintend the work.

The most enthusiastic followers of the art of floral arrangement in Japan, we are told, are priests, philosophers and men of rank who have retired from public life. It has always been regarded as a fitting occupation for learned and literary men, and not at all as an effeminate accomplishment, although ladies of the aristocracy practice it as they do the other arts. Some of the virtues which are said to spring from an habitual practice of this charming art are "the religious spirit, self-denial, gentleness and forgetfulness of cares."

In a recent bulletin of the Michigan Experiment Station a record is made of the test of the value of the practice of transplanting Onion-seedlings. Seeds of several varieties were sown in a hot-bed on the 10th of April, and on the 16th the plants were transplanted to the field. Seeds of the same sort were on the same day sown in a parallel plat for comparison. The soil was rich sandy loam, and the same care was given to both tracts, with the result in every case in favor of the transplanted Onions. The variety known as Prize-taker yielded, when transplanted, 548 bushels to the acre, while those not transplanted yielded 216. The Rocca, transplanted, yielded 556 bushels against 110 when not transplanted, and Southport yielded 296 bushels against 172.

Professor Penhallow, of the McGill University, has reprinted from the *Canadian Record of Science* his papers on the *Flora of St. Helen's Island, Montreal;* and on the *Flora of Caconna, Province of Quebec*, a flora which he finds of especial interest from the fact that it contains several southern types obviously near or at the extreme northern limits of their distribution, and also many distinctively boreal species. The prevailing arboreal vegetation of Caconna Island, which in reality is not an island, but is connected with the mainland by a low neck of land not entirely submerged, even at high-water, is composed of the Black and White Spruces, the Red Pine and White Pine (this last very rare), the Larch and the Arbor-vitæ. The Sugar Maple, the Banksian Pine and the Aspen are common, and the Canadian Yew is often the most abundant undergrowth of the forest.

A new edition of Sir Joseph Hooker's *Himalayan Journals*, edited by G. T. Bettany, has just been added to the Minerva Library of Famous Books, published in London by Ward, Lock, Bowden & Co. This cheap edition of one of the best books of scientific travel ever written, which has long been out of print, will be a real boon to every student of science. The illustrations are printed from the original wood-cuts, and the present edition, in one volume, is identical with the first unabridged edition, except that some of the appendixes of limited general interest are omitted. The editor adds an interesting sketch of the author of the *Himalayan Journals;* these were published in 1854, and the author, now the most distinguished English botanist, is very nearly at the end of his task of describing the plants of India, for which he fitted himself in the long and dangerous journeys of which these *Journals* are the record.

The eleventh part, the last to reach us, of the American edition of the sumptuous *Lindenia*, or *Iconography of Orchids*, conducted by the Messrs. Linden, of Brussels, with the assistance of Em. Rodigas and R. A. Rolfe, contains portraits of Cattleya × Hardyana, var. Laversinensis, a supposed natural hybrid between C. aurea and a variety of C. gigas, imported several years ago from New Granada. The flowers are fragrant, with light rosy mauve sepals and petals, and a deeper-colored lip. Several forms of what are doubtless the same hybrid, differing slightly in the color and markings of the flowers, have appeared in different collections. The one which Monsieur Linden has selected for his beautiful plate first flowered in Baron Rothschild's gardens at Laversine, in France. The other figures in the number are of Rodriguezia pubescens, Ærides suavissimum, and Disa grandiflora, the magnificent terrestrial Orchid from South Africa, a now well-known plant, but hardly surpassed in the beauty and showiness of its flowers by any other Orchid. *Lindenia* is a store-house of information which cultivators of Orchids will find invaluable. The illustrations are not surpassed by those of any other work of the same character and scope.

In a paper prepared for the American Pomological Society, Professor W. F. Massey calls attention to the peculiar advantages of the mountain-region between the Blue Ridge and the Alleghany Ridges in western North Carolina for the cultivation of apples: "The wonderful capacity of these elevated valleys and mountain-slopes for the production of apples of a size, beauty and flavor unknown in the same varieties grown elsewhere, is rapidly coming to be acknowledged since the great displays made by this section at the Centennial Exposition and at the meeting of this society in Baltimore in 1877. The trees are larger, more vigorous and longer-lived than in most other places. In one orchard, in Haywood County, there are more than 100 trees averaging nine feet in circumference of trunk. Trees of this size are common in most of the mountain counties, and they are in the most luxuriant health. In the elevated valleys about Waynesville, in Haywood County, the Yellow Newtown Pippin grows to the same perfection as on the mountain-sides in Albemarle County, Virginia, where it is known as the Albemarle Pippin. In the summer of 1890 there was scarcely any fruit in all the country east of the Mississippi River and in all other parts of this state. In these mountains not only were the Apple-trees loaded with fruit, but Peach-trees were breaking down with their crop. That there are extensive belts on these mountain-sides where early autumnal and late vernal frosts are unknown, is a well-attested fact, and this renders the culture of fruit there more certain than in any other section of the eastern states."

In the Government report of crops for last year there are some valuable lessons as to the prices of farm-products. The crops were almost without exception large, and under such circumstances prices are always reduced. Singularly enough this decline in prices is often greater in proportion than the increase in production, so that the surplus depresses the total value of the crop. For example, in 1890 the supply of potatoes per capita was smaller than it had been for many years, and therefore the price per bushel ranged very high; nevertheless the inferior quality in most of the districts where production is the largest prevented farmers from securing the advantages of these high prices. Last year the crop was enormous and the acreage planted large, so that there has been a heavy decline in prices. This decline has been so serious that while the country produced 100,000,000 bushels more than it did the year before, the aggregate value of the crop is less than that of 1890 by $20,000,000. On the other hand, the wheat crop was twenty per cent. greater in 1891 than in 1890, and yet the price per bushel slightly exceeds that of a year ago. The reason for this is that, although the crop is largely beyond the requirements of home consumption, there is an extraordinary demand for it abroad which has sustained the prices. The aggregate value of the present wheat crop is about $179,000,000 greater than that of last year, and the enormous corn crop, in spite of the fact that it is twenty per cent. less per bushel than it was last year, is worth to farmers at December prices about $80,000,000 more than the crop of 1890.